10310001/10310002

Hephaestus V094/V213

Vacuum Ovens

User Manual

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II. Safety

IMPORTANT Safety Items to be Observed.

Safety Warnings

! DANGER (may cause serious damage to property and or casualties)

1. Please carefully read this user manual prior to operating the instrument and observe the instructions on safe operation.
2. The power source must be grounded reliably and away from any sources of electromagnetic interference.
3. Confirm that the voltage and frequency of the power supply matches the specified voltage and frequency specified prior to use.
4. The instrument should be operated on an independent power outlet.
5. Do not allow the instrument to be plugged in or unplugged whilst the power switch is in the on position.
6. Do not modify the power cord.
7. The working environment must be free of any flammable, explosive, volatile or corrosive substances.
8. The instrument is deenergised only when the power cable is disconnected from the power source.
9. This instrument is for indoor use only.
10. The instrument should be operated in a low humidity, well ventilated dust and water free environment, without direct sunshine or an intense magnetic, light or heat source.
11. Ensure that the instrument and its accessories are free of any potential defects.
12. Ensure that the instrument is secured tightly, and only standard accessories supplied by the manufacturers are used with this instrument.

! WARNING (may cause property damage or personal injury)

13. Prevent water from splashing on the electrical elements of this instrument.
14. Before assembly, disassembly, cleaning or maintenance, the power source must be disconnected.
15. It is prohibited to place flammable, explosive, volatile or corrosive substances into the oven.
16. Do not touch the chamber door, the chamber body or the surrounding surface when the set temperature is over 80℃ (176℉) to avoid burns.

! ATTENTION (may affect operational performance or service life)

17. When pulling the power plug out from a power source, do not pull out using the power cord directly.
18. Only accredited and qualified professional repair technicians can open the instrument or conduct required repairs. Persons performing repairs on the instrument other than those selected or approved by the Company shall operate to void any warranty contained hereinabove for the product.
19. The 304 stainless steel liner is not acid resistant, please adhere to advised anti-corrosion measures and NEVER use acidic media within the oven to prevent damage.

III. Hephaestus V094/V213 Vacuum Ovens – Introduction

The Hephaestus V vacuum ovens are designed to efficiently process raw materials in a temperature-controlled vacuum environment. This process has the following advantages:

- The partial vacuum decreases the boiling point of water and thereby decreases the process temperature and increases the rate of moisture evaporation.
- The reduced processing temperature minimizes the oxidation rate of the product ensuring less oxidative damage.

The Hephaestus V Vacuum Oven is constructed from 304 stainless steel and the exterior surface of the oven is polymer coated. The inner chamber uses either a galvanized or a stainless-steel armour plate. Fiberglass insulation is used to thermally insulate the chamber. The cabinet door has a viewing window that allows visual inspection of the process. The window is constructed using a double-layered fortified glass design. The door uses a heavy-duty column door pin.

Temperature is monitored and controlled using a Pt100 sensor and a temperature controller. The temperature controller allows the output power with to be controlled using a PID. It also monitors the process temperature and corrects temperature fluctuations and monitors processing time(s).

3.1 Vacuum Oven Overview

1) vac-gauge
2) controller
3) LED switch
4) vac-valve
5) handle
6) LED

7) inlet
8) outlet/kf25
9) power switch
10) power cord
11) gas/air

The Hephaestus V094/V213 vacuum oven uses 5-15P power plug (see figure below).

3.3 After Sales Support

If problems are encountered or technical assistance support is required, when installing or using the instrument, please immediately contact the service department at ServiceUSA@hollandgreenscience.com. The Company may provide technical assistance and information regarding the instrument or equipment or service without charge at its sole discretion. Buyer assumes sole responsibility for any reliance on or use of such assistance and information, and the Company makes no warranty thereon.

Upon contact the following information is required to be provided:

- Product serial number (located on rear panel instrument nameplate)
- Warranty card
- Description of issue or problem (i.e., software or hardware)
- Method and or operating steps you have undertaken towards resolution.
- Your contact details inclusive of telephone number and email address.

For claims under the warranty please contact your local supplier. You may also send the instrument directly to manufacturer, enclosing the invoice copy and by giving reasons for the claim.

3.4 Proper Use

The instrument is designed for non-residential use e.g. in schools, laboratories or factories and to be used in conjunction only with accessories recommended within this manual and by the manufacturer.

IV. Technical Specifications

Model / Index / Name	10310001	10310002
Voltage	AC 120V 60Hz	
Input Power (W)	1350W	1550W
Control Scope (℃)	RT+10~200 RT refers to Environment Temperature	
Fluctuating Degree (℃)	1.0	
Attainable Vacuum Degree	133Pa	
Number of Shelves per Model (Layer)	4	3
Inner Chamber Material	304 Stainless Steel	
Inner Chamber Size (mm)	450×450×450	600×600×600
Oven Outer Dimensions (mm)	740×610×591	890×781×795

Note: 1. This product is produced according to Q/TIWY7-2004.
2. All Technical specifications indexed are conducted under the situation with environment temperature 25℃, relative humidity ≦85% and vacuum degree is ≧ 0.1Mpa, and all data has been tested with a mercurial thermometer to the precision ±0.1 ℃. The mercurial head of the thermometer touching the surface of the shelf inside the cabinet.

V. Standards and Conformity

Construction in Accordance with the following Safety Standards:
UL 61010-1:2012 CSA C22.2#61010-1-12:2012 UL 61010-2-010:2015 CSA C22.2#61010-2-010:2015
Construction in Accordance with the following EMC Standards:
EN 61326-1

VI. Inspection

6.1 Packing List

Unpack the equipment carefully and check for any damage which may have arisen during transport. In the event of identified damage, please contact serviceusa@hollandgreenscience.com

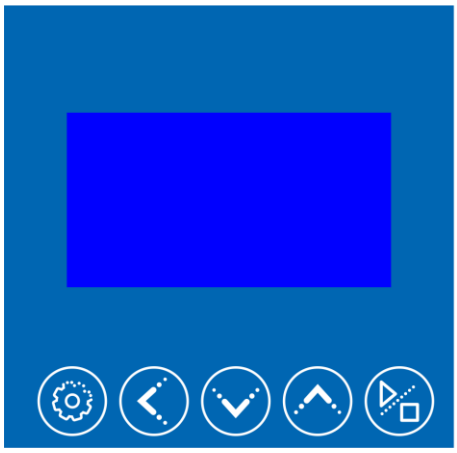
Type	Item Description	Quantity
Main Unit	Vacuum Oven	1
Fittings	Vacuum Connection Pipe	1
Fittings	Spanner	2
Quick Setup Card	Scan to download user manual	1

Note:

If you find any visible damage on the product, please do not connect the product to power supply.

VII. Operating Instructions

7.1 Temperature Controller Panel



Description of Controller Panel Keys

1)  Press and hold the key for 3s or more to control the run/stop of the program.
2)  In the setup mode, press this key to add one number and hold the key to increase numbers successively.
3)  In the setup mode, press this key to decrease one number and hold the key to decrease numbers successively.
4)  Return.
5)  Set the target temperature and enter the internal parameter layers.

7.2 Functions

- **F1**: first layer measurement temperature
- **F2:** second layer measurement temperature
- **F3:** third layer measurement temperature
- **F4**: fourth layer measurement temperature
- RUN/STOP: display of running status
- 14: 09: time display of controller system
- SET: display of set value. (°C: display of temperature unit symbol)

7.3 Priming the Vacuum Pump

- Priming of the vacuum pump requires that the connecting tube provided is securely (airtight sealed) placed between the vacuum pump and the vacuum oven.
- The oven door should be securely shut, and the door handle secured in a closed position (this will prevent air from entering the chamber by causing the hole in the rubber plug and the hole in the pipe core to be 180 ° out of phase).
- Power to the vacuum pump should be turned on and then the vacuum valve should be closed by turning the handle clockwise 90°during processing.
- To stop the process, reduce the vacuum in the chamber -0.1Mpa before turning off the vacuum pump. This will ensure that no engine oil from the vacuum pump will be drawn into the chamber.

7.4 Priming the Vacuum Oven

- Turn on power to the vacuum oven (a power-on indicator light will confirm this) and after a 5 second self-test is completed; the temperature controller will automatically enter the “run” mode. This will allow the PV screen to display the process temperature and the SV screen display the set temperature.
- Once the process begins the AT indicator light will turn on and if process temperature is less than the set temperature heating lamps will turn on.

7.5 Setting of Temperature

- When the instrument is switched on, press the button one time, and the “set temperature value” will start to blink. Set the desired temperature value (in Celsius degrees) by pressing keys.
- Use the button to move between the digits.
- Confirm the set value by pressing the button.

Note:

Pressing the ‘ or ’ key once changes the value by 0.1.
Press and hold the keys changes the value rapidly.

7.6 Start / Stop Operation

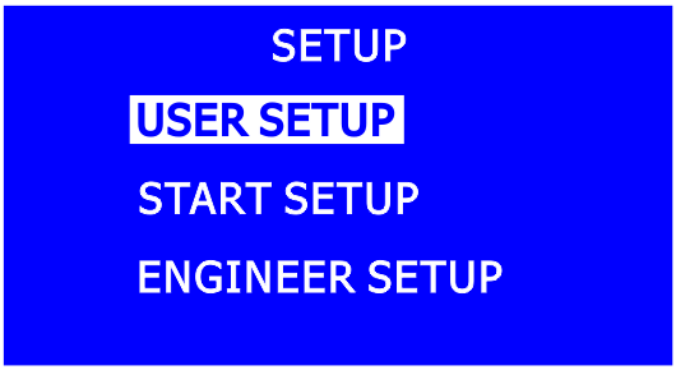
- After setting the operating parameters, press button for 4-5 seconds to start the heating process. When the word “STOP” appears on the upper right corner of the screen, the system is in the stopped state. When the message “RUN” appears in the

upper right comer, the system is in the running state and the screen will display values like timer, temperature measured inside the chamber.

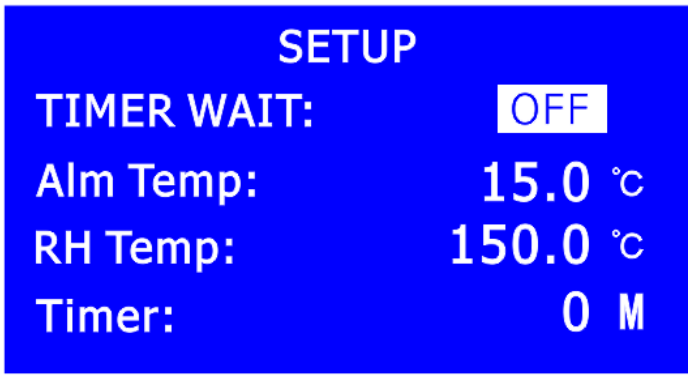
- At any time, you can always manually stop running by pressing the button for 4-5 seconds.

7.7 Setting the Deviation Alarm and Timer

- On the controller panel, press and hold the key for 4-5 seconds.



- Press key to confirm, press or key to move, press key to return.



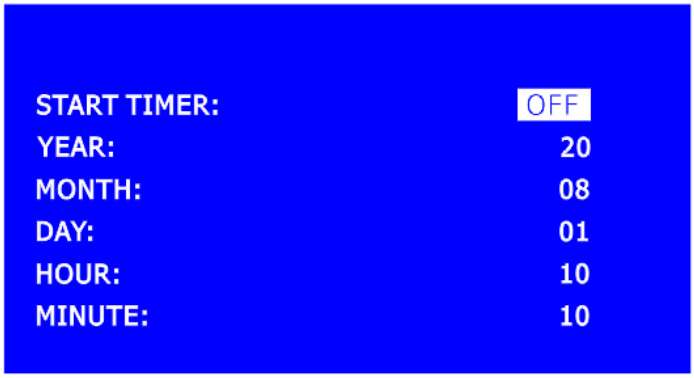
- TIMER WAIT: ON/OFF of waiting temperature. When ‘ON’ the waiting temperature is available. When ‘OFF’ no waiting temperature is available.
- ALM Temp: Setting of temperature deviation alarm: when the measured temperature > set temperature +ALM TEMP, an audible alarm will sound.
- RH Temp: Setting of the upper limit for Temperature Control.
- Timer: When the time is set as 0, timing function is not available.
  When other than 0 is applied the controller is in ‘Timer’ function.

Press the key so, that Timer numerical value is back lit displayed, indicating the timer can now be set as required, by pressing either the or key.

NOTE: If no operation is performed for a long time, the system automatically returns to the home screen.

7.8 Setting the Pre-set Start Function

- Press and hold the key and press key, then shift the cursor to ‘START SETUP’, and press key.

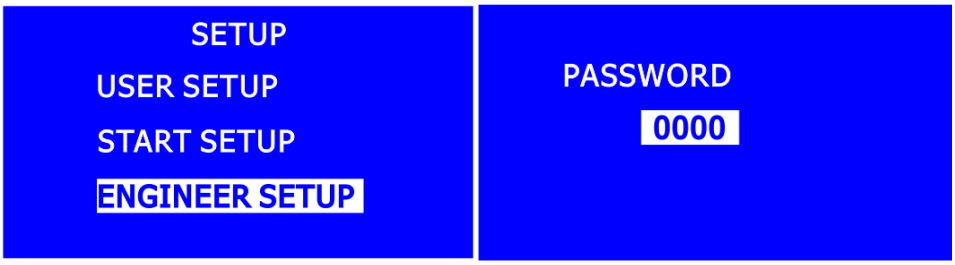


1) START TIMER: Press ‘ON’ to start the Pre-Set timer function settings
2) YEAR, MONTH, DAY, HOUR, MINUTE: Enter timer pre-set required details

7.9 Setting the ENGINEER SETUP

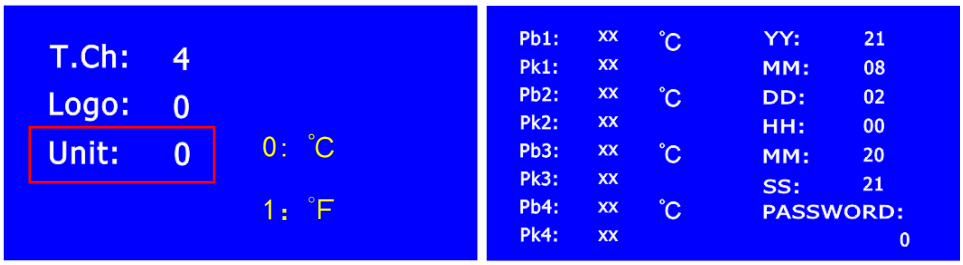
- Press and hold the key and press key, then shift the cursor to ‘ENGINEER SETUP’, and press key, enter password (The default is”0”) and press to confirm. Press key to move, press key to confirm, and then press or key to adjust.

NOTE: The parameters here are factory parameters, do not adjust (except for the system date and password)



7.10 Unit, SYSTM Timer and PASSWORD Settings

- Unit:"0" ℃, "1" ℉
- YY: year; MM: month; DD: day; HH: hour; MM: minute; SS: second; (this is the apparatus system time setting)
- PASSWORD: for direct input and changing of new password.



VIII. Cautions

- Combustible materials and corrosive liquids or gases should not be placed in the vicinity of the drying cabinet.
- If the product is excessively damp before drying, add a “precipitation” filter between the vacuum pump and the cabinet to avoid steam entering the pump.
- If a granular product is to be dried, a $5\ \mu$m filter should be added in series before the vacuum intake.
- If the air release rubber stopper becomes difficult to turn, Vaseline may be used to lubricate the contact area.
- The vacuum chamber should always be clean. The glass on the cabinet door should only be cleaned using a soft cotton cloth.
- Whenever the vacuum cabinet is not used for a prolonged period of time, it is recommended that all exposed plated parts be cleaned by nonabrasive lubricant. It is recommended that a plastic film cover be placed over the cabinets to prevent dust from accumulating.

X. Fault Diagnosis

Fault	Possible Causes	Solution
No Power	External power supply outlet has no power.	Check power outlet
	The power plug is not correctly inserted into the socket	Re-insert the power plug into the socket check switched 'ON'
	Failed fuse	Check the fuse. Replace the fuse.
PV Display	Temperature sensor (Pt100) is damaged	Check Pt100. (0℃, 100Ω, 0.3Ω/℃) Replace if required
	Temperature sensor line issues encountered.	Re-connect the lines again.
Temperature Not Increasing	The SET value is too low	Set temperature SV ≥ ambient +10℃
	Temperature controller has no output	Replace the temperature controller
	The heater is damaged (short circuit, or open circuit)	Replace the heater
	Timing function or the setting is not correct.	ST=0 or ST= (heating time +constant temperature time)
Temperature Issues * Out of Control * Offset or Overshoot * Error Display Tested Temperature vs. Real Temperature	The output of the temperature controller is unreliable	Replace 3041 or BTA
	Pt sensor not connecting well.	Reconnect PT sensor
Large Variance Between Test Temperature and Real Temperature.	Relevant parameters are not correctly set.	Re-set all relevant parameters, such as Ar, P etc.
	Insufficient vacuum	Check vacuum pump
	The parameters within the vacuum oven are not accurate or correct	Re-arrange Pb, and Pk parameters.

Unable to maintain vacuum within chamber	The vacuum pump is not the correct size for the volume within the vacuum oven	The vacuum pumping speed should not be less than 2 Litres per second
	Various connecting flanges and pipes are not secured or coming loose	Check all are securely fitted if not replace applicable fittings.
	The vacuum gauge is damaged.	Replace the vacuum gauge.
	The oven door is not closing well.	Adjust the door pin distance.
	The airproof rubber door seal is aged and lacks elasticity.	Replace the airproof rubber door seal
	Air release valve and vacuum valve are not in the correct place.	Manually adjust positioning
	The electromagnetic valve is damaged. (Models 6090 & 6210)	Replace electromagnetic valve
Air Leakage Vacuum Degree Decreased to 0.092 Mpa from 0.1Mpa within 24 hours.	There is air leakage in various connect pipes and flanges	Check all and replace if required
	Heat incurred from the oven can distort the shape of the “O” ring causing air leakage.	Screw tight the heater seat (Located in the back of the inner bladder) or replace the “O” ring.
	The air release valve is not in the right place.	Manually adjust into the correct position
	Air leakage within the vacuum valve.	Replace the vacuum valve
	The electromagnetic valve cannot be closed and there is air leakage.	Replace the electromagnetic valve.

XI. Maintenance and Cleaning

Proper maintenance and operation of the vacuum oven is required to ensure good working condition and extend the oven's service life.

Keep the vacuum oven dry and clean in routine operations. Clean the exterior of the vacuum oven with a non-abrasive cleanser and only connect the power supply when the oven surface is dry.

If liquid or moist solids are spilled the vacuum oven, please immediately disconnect the power supply and contact the service department.

- Power must be disconnected before any maintenance or cleaning.
- Surface stains on the vacuum oven should be cleaned only by a clean, soft rag and detergent.
- Keep the product clean and ensure no cleaning solution is spilled inside the vacuum oven.
- Avoid cleaning the vacuum oven with any corrosive cleaning solutions.
- If the vacuum oven is left unused for a long period, switch 'OFF' the power and store within a dry and clean area on a level surface at room temperature.